Sustainability, Encroachment, and Room to Maneuver

Encroachment analysis tools within Fort Future

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Problem

- External pressures (encroachment) are impacting the military services' ability to maintain force readiness.
- Encroachment is defined as:

"Any outside activity, law, or pressure that affects the ability of military forces to train to doc… missio…

Objective

To develop technical capabilities and expertise to

- understand, predict, visualize, communicate
- help understand land use trends
- relate these trends and actions to the sustainable futures of military installations, waterways and other Army/DOD missions.
- evaluate alternative plans – and their projected spatial and temporal impacts

Sustainability in Context

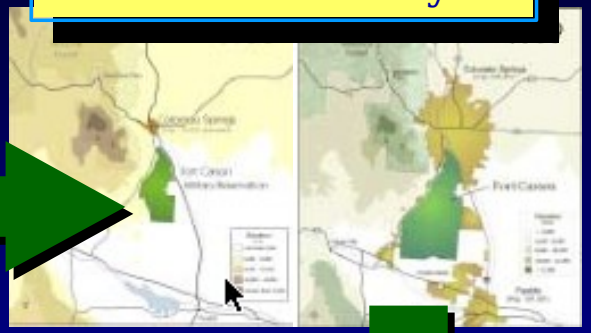
- Sustainability is about long-term success
- It is the ability to function or operate into the future without decline…
- Key concern is exhausting or overloading resources and ecosystems we need
- Army installations operate and interact within a regional context
- Exhausting or overloading regional resources and ecosystems is unsustainable

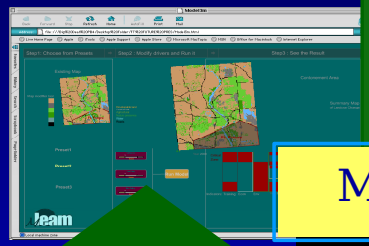
Sustainability Factors

SERM Approach

Assess and compare risks

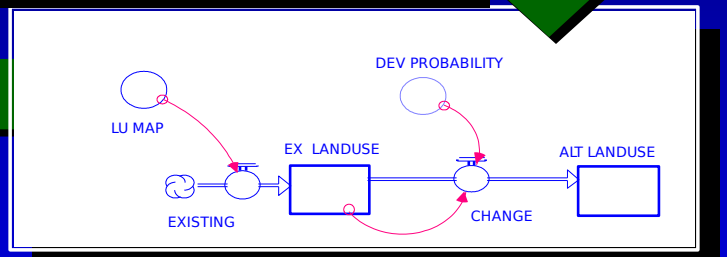
Conduct Trend Analyses

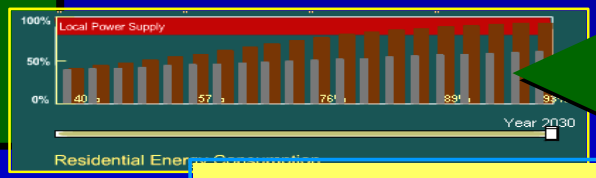




Mitigate Problems

Project Future Changes





Identify Mission Impacts

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Sustainable Installation Risk Assessment methodology

Objectives:

- **National level risk assessment tool for military installations (in US)**
- **Evaluate sustainability risk for energy, transportation, infrastructure, and water resources**
- **Support to Installation sustainability planning, stationing changes, base closure, realignment issues**
- **Comparative look across multi installations highlights regionally specific issues, mitigation strategies, and informs community coordination efforts**
- **Issues and Stressor Matrix:**
  - **Air, Energy**
  - **Land Use**
  - **Water**
  - **Ecosystems (Protected Species and Habitat)**
  - **Socio-Economic**
  - **Interest Groups, and**
  - **Infrastructure**

Sustainable Installation Risk Assessment

Supports Objective Force Training Requirements

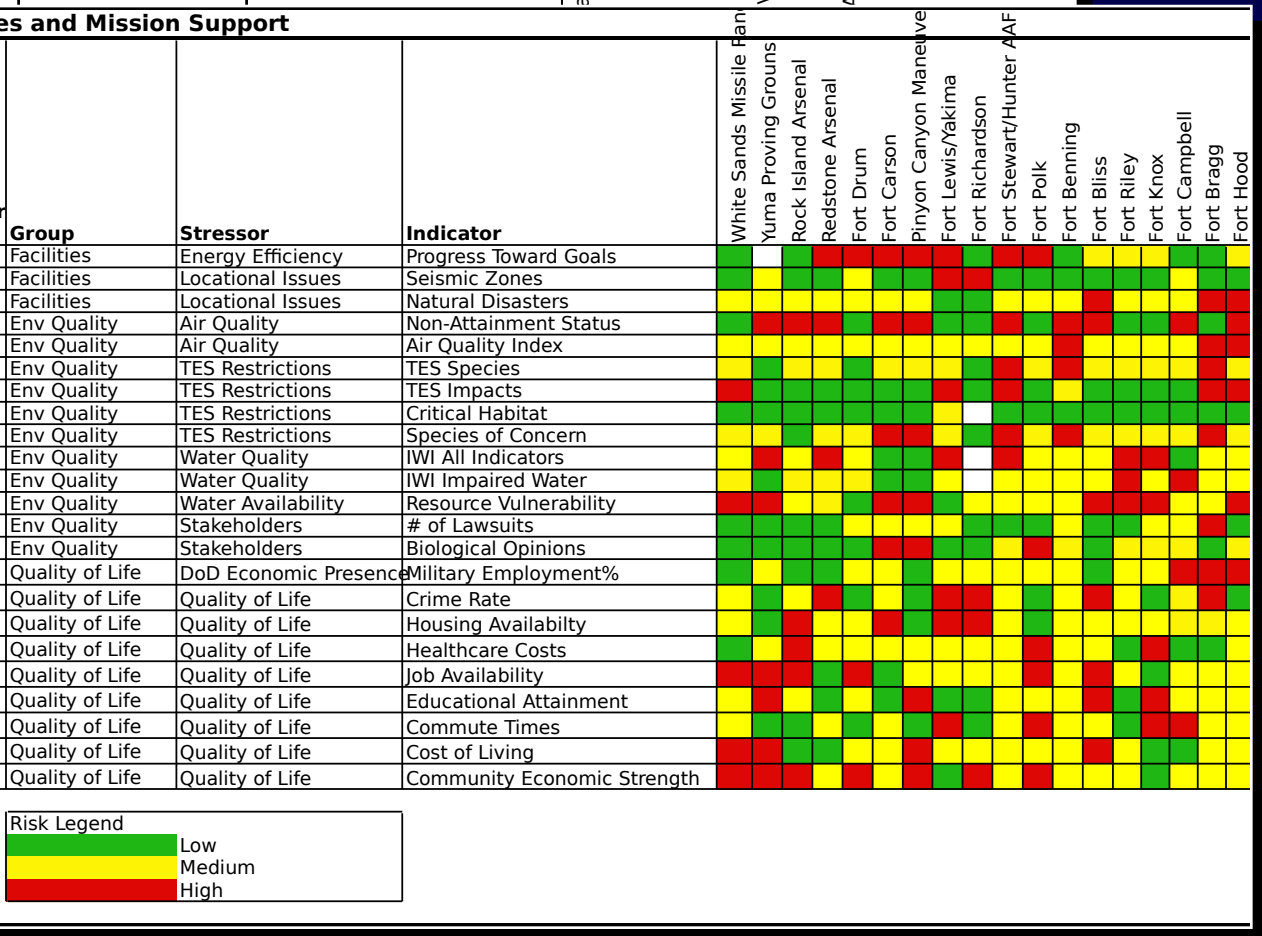
Indicator Number	Issu
N1	Air
N2	Air
UD1	Lanc
UD2	Lanc
UD3	Lanc
UD4	Lanc
UD5	Lanc

Strategic Response Capaility

	Issue
EA1	Energ
EA2	Energ
EA3	Energ
EA4	Energ
ES1	Energ
WS1	Wate
TA1	Infras
TA2	Infras
TRR1	Infras
TRR2	Infras
TR1	Infras
TR2	Infras
TR3	Infras
SP1	Infras

Facilities and Mission Support

Inidcator Number	Group	Stressor	Indicator
EE1	Facilities	Energy Efficiency	Progress Toward Goals
LI2	Facilities	Locational Issues	Seismic Zones
LI3	Facilities	Locational Issues	Natural Disasters
AQ1	Env Quality	Air Quality	Non-Attainment Status
AQ2	Env Quality	Air Quality	Air Quality Index
TE1	Env Quality	TES Restrictions	TES Species
TE2	Env Quality	TES Restrictions	TES Impacts
TE3	Env Quality	TES Restrictions	Critical Habitat
TE4	Env Quality	TES Restrictions	Species of Concern
WQ1	Env Quality	Water Quality	IWI All Indicators
WQ2	Env Quality	Water Quality	IWI Impaired Water
WA1	Env Quality	Water Availability	Resource Vulnerability
SH1	Env Quality	Stakeholders	# of Lawsuits
SH2	Env Quality	Stakeholders	Biological Opinions
DP1	Quality of Life	DoD Economic Presence	Military Employment%
QL1	Quality of Life	Quality of Life	Crime Rate
QL2	Quality of Life	Quality of Life	Housing Availabilty
QL3	Quality of Life	Quality of Life	Healthcare Costs
QL4	Quality of Life	Quality of Life	Job Availability
QL5	Quality of Life	Quality of Life	Educational Attainment
QL6	Quality of Life	Quality of Life	Commute Times
QL7	Quality of Life	Quality of Life	Cost of Living
QL8	Quality of Life	Quality of Life	Community Economic Strength



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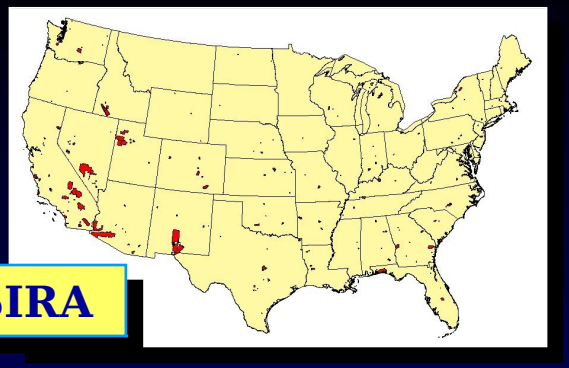
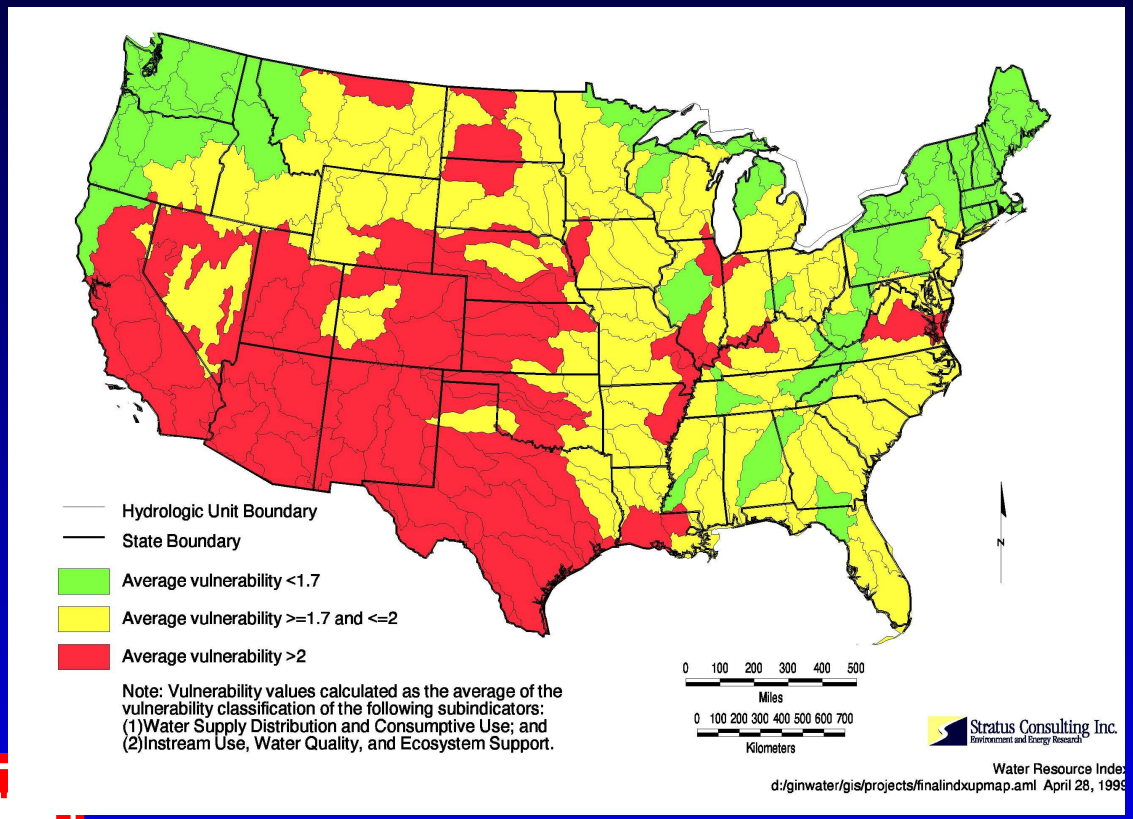


Indicator Selection Criteris

- Availability of data
  - National data sets: EPA, USGS, Census, NOAA
  - State data: energy and land use regulations
  - Army data: noise, TES, energy use
- Ability to Measure Parameter
  - Data definition includes low, medium, and high risk ratings
  - Metadata for quality assurance
- Relevant to Mission Sustainability and Encroachment
- Graphical Display
  - Easily converted to GIS for national assessment effort

Sample Criteria: Water Quality

Issue	Stressor	Indicator
Water Resource	Quality	EPA Index of Water Indicators (IWI) Database

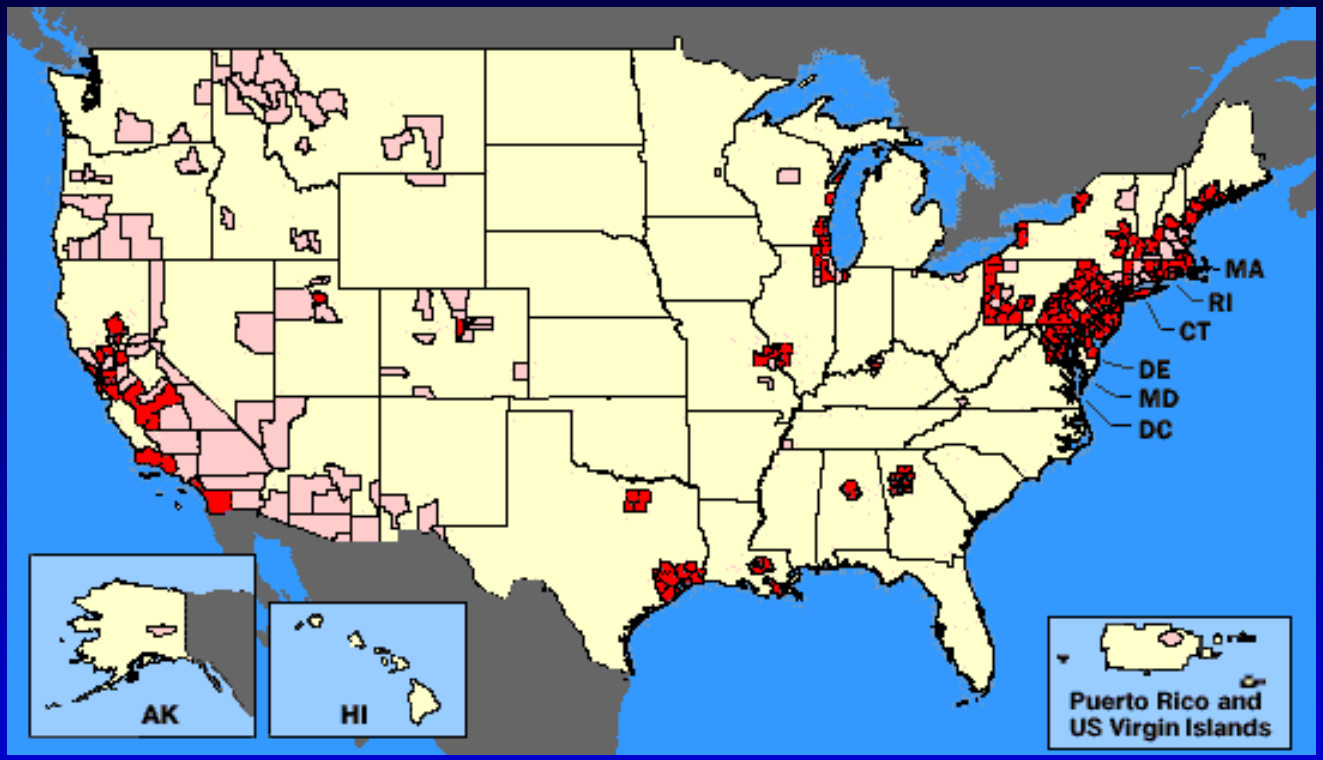


Data
Waters meeting designated uses
Fish & wildlife consumption advisories
Indicators of source water condition
Contaminated sediments
Ambient water quality - toxics
Ambient water quality - conventional
Wetlands loss
Aquatic and wetlands species at risk
Loads over limits - toxics
Loads over limits - conventional
Urban runoff potential
Agriculture runoff potential
Population change
Hydrologic modification caused by dams
Estuarine pollution susceptibility
Atmospheric deposition

16 indicators are combined in one index of water quality

Sample Criteria: Air Quality

Issue	Stressor	Indicator	Data
Air	Quality	EPA Non-Attainment for Criteria Pollutants	Maximum value of any criteria pollutant



Entire county is non-attainment
Part of county is non-attainment

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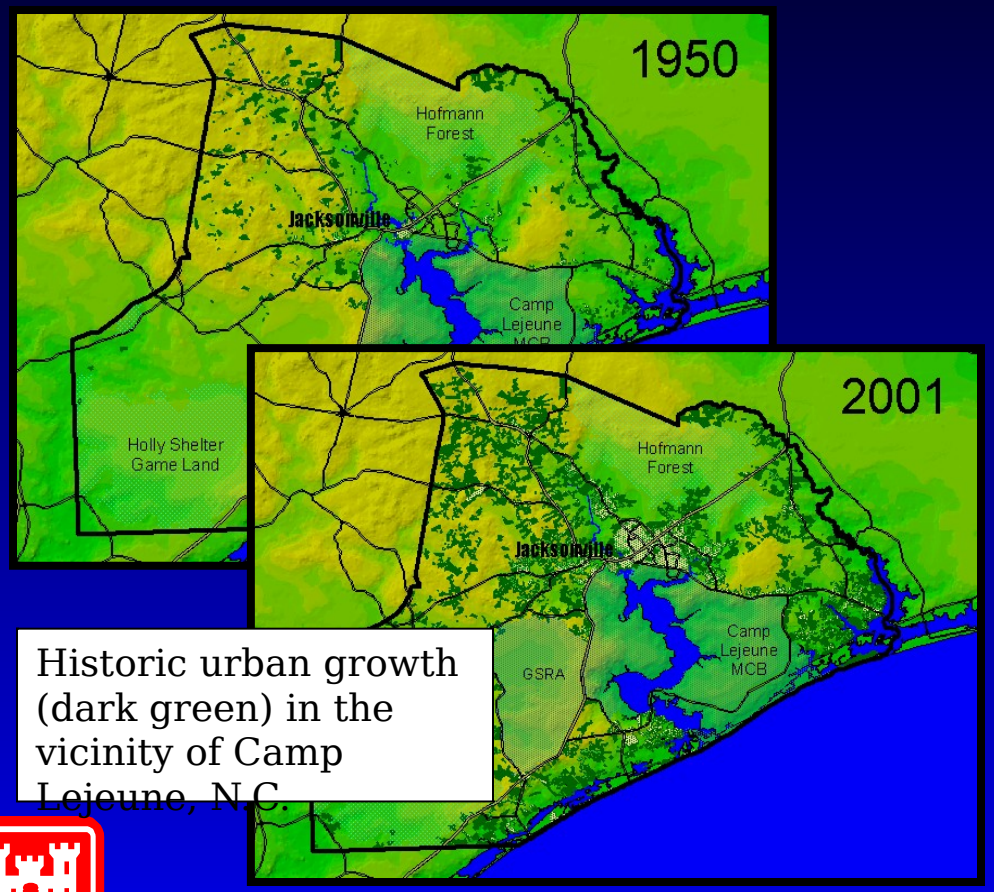
Current Plans for Installation Risk Assessment

- New national risk assessment to be available in May 2003.
- Data for all U.S. installations, all services
- For Army installations, Army Environmental Policy Institute (AEPI) will form panel of experts to conduct interpretations of assessment elements to identify relevance to stationing.
- For “relevant” elements (those that potentially impact stationing decisions) further interpretation will convert impact to “soldier absorption capacity” for possible inclusion in Optimal Stationing of Army Forces (OSAF) model.

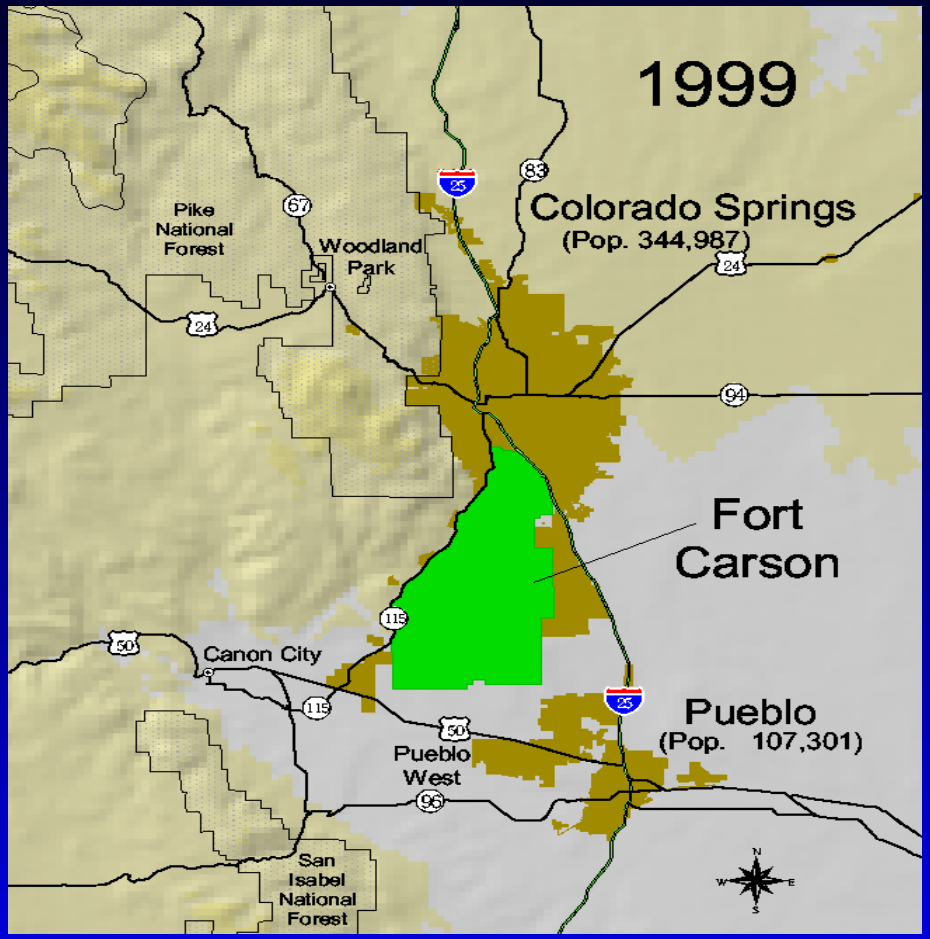
Conduct Trend Analyses



Historic urban growth (dark green) in the vicinity of Camp Lejeune, N.C.

- Trends are drawn from the analysis of:
  - historic land use
  - land cover
  - satellite imagery
- Results are presented in images and video

Changing Land Use Trends Around Ft. Carson, Colorado



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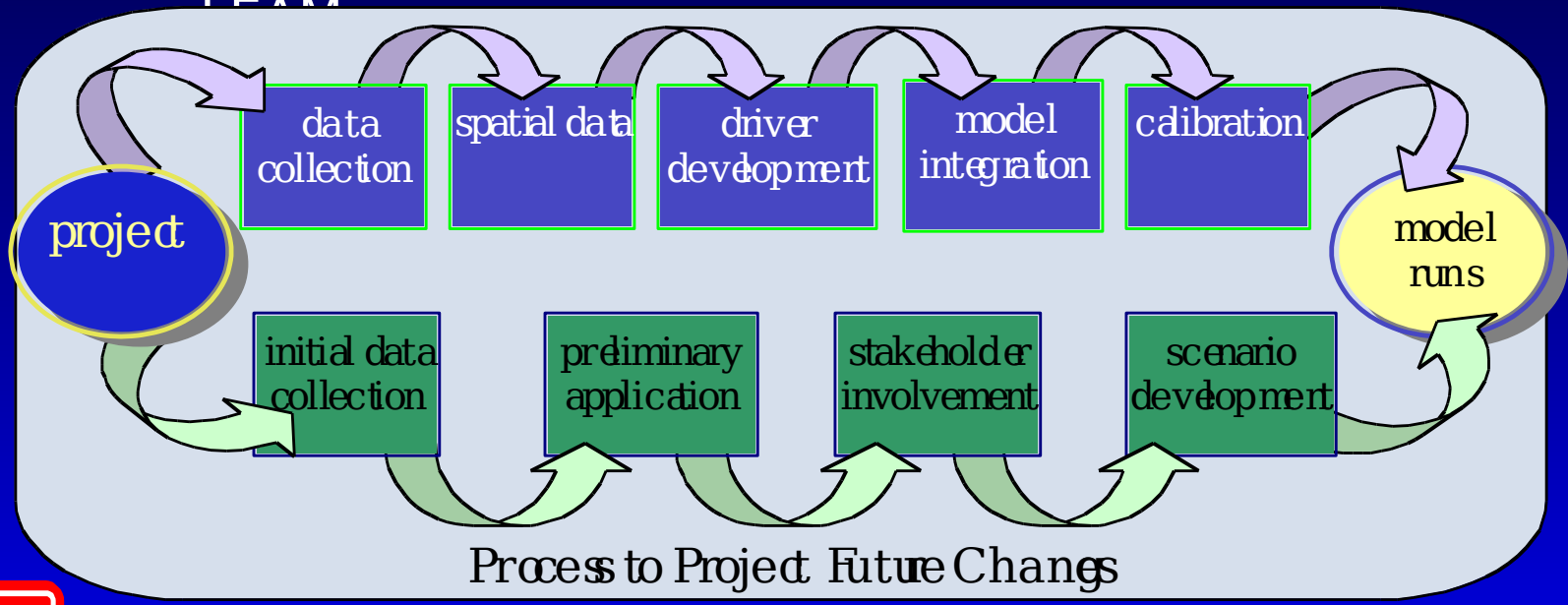
Project Future Changes

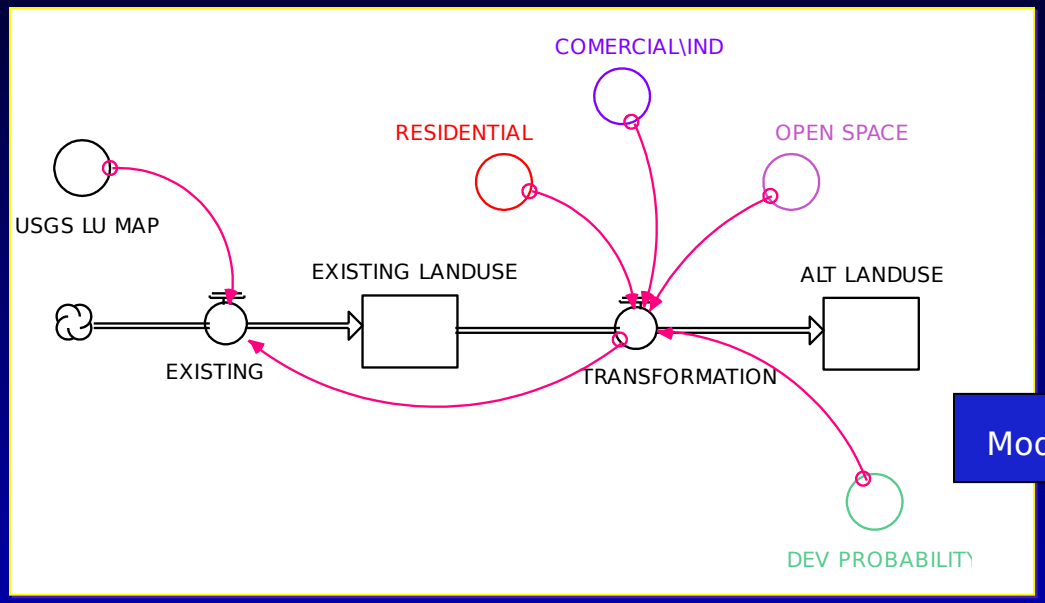
- Create and run raster-GIS based land use change simulation models
  - Land use Evolution and impact Assessment Model - LEAM



Process to Project Future Changes

land use drivers

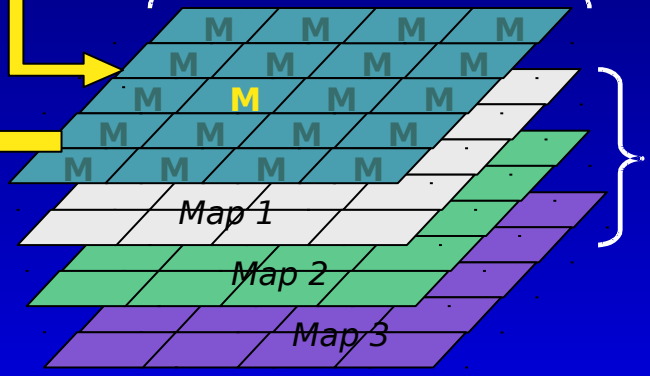
conceptual framework



what if ?

Model Drivers

SME



GIS Maps

Impact Assessment

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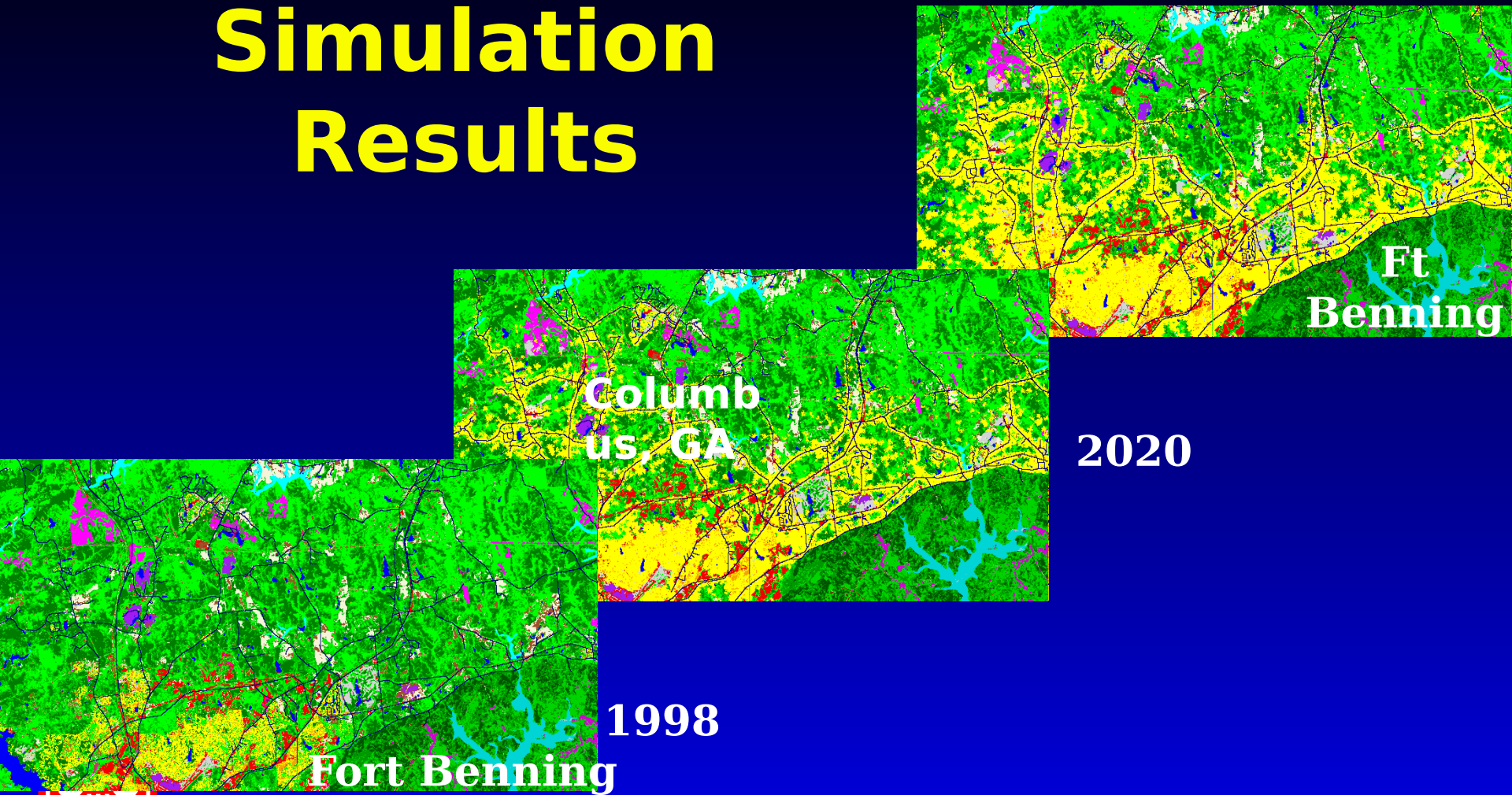
Ft Benning Simulation Results



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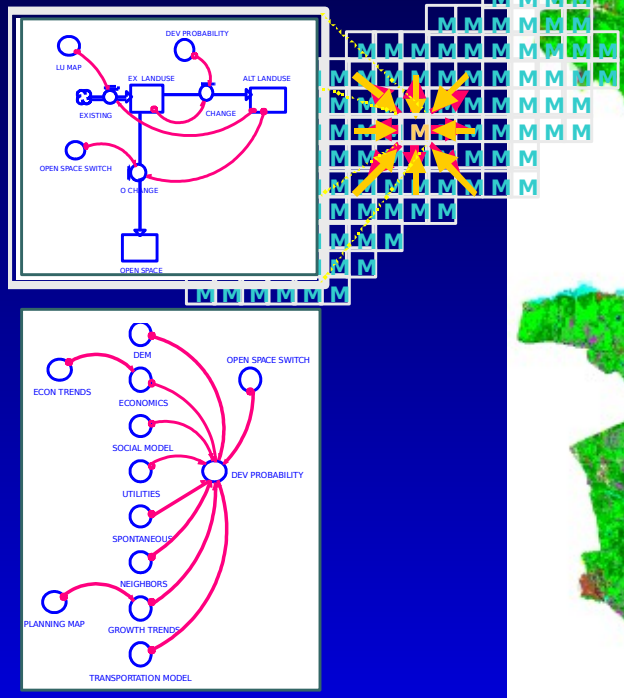
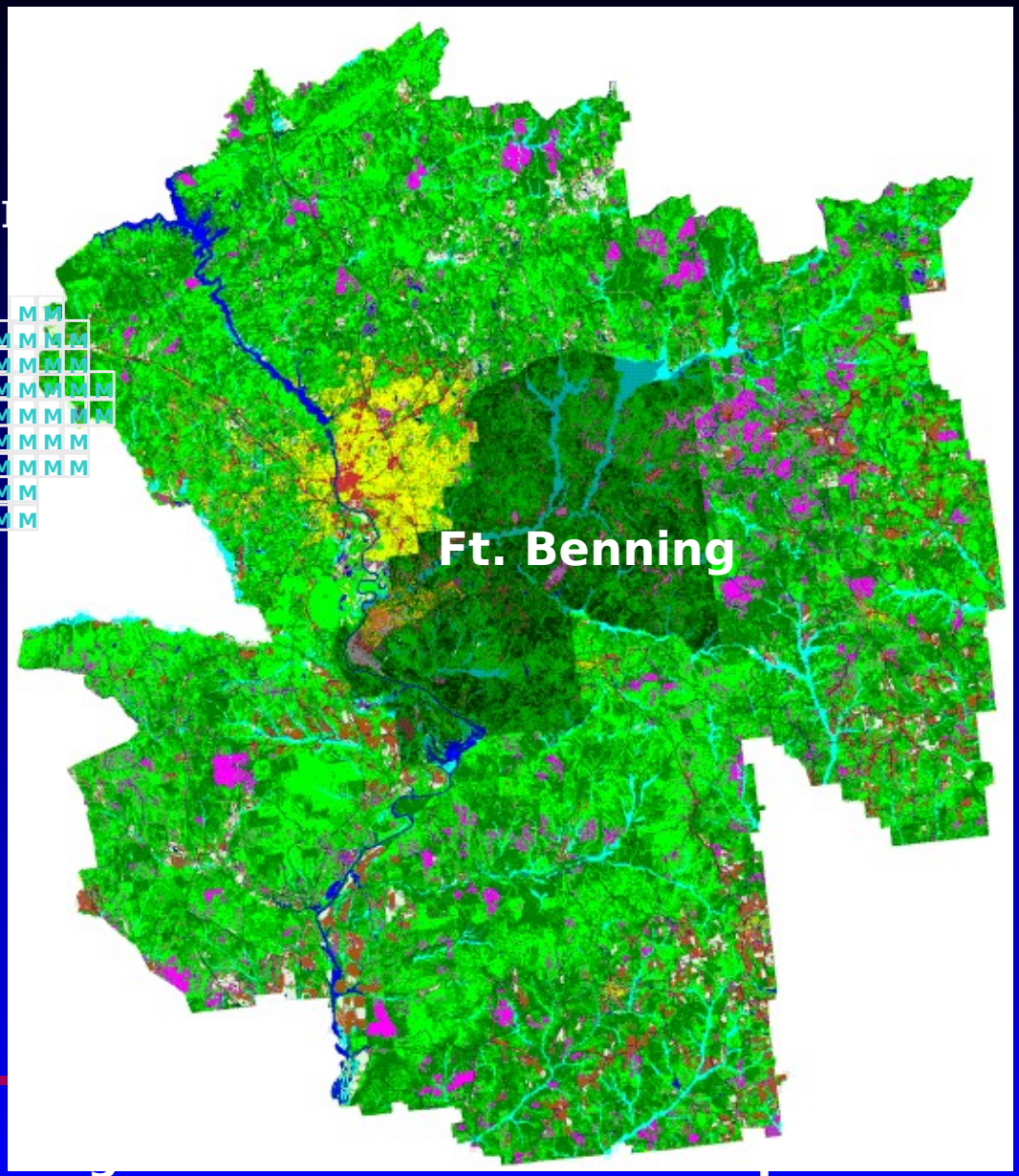
Data Requirements for LEAM Projections

- Land Use Land Cover. Source: USGS, National Coverage 1993 and 2000.
- Population and Population Trends. Source: Census Bureau, every decade, every county.
- Digital Elevation Models. Source: USGS, National level, multiple resolutions.
- Public Land Holding: Federal, State, Local sources.

current model

Columbus/Ft Benning
8 million cells – 40 yea





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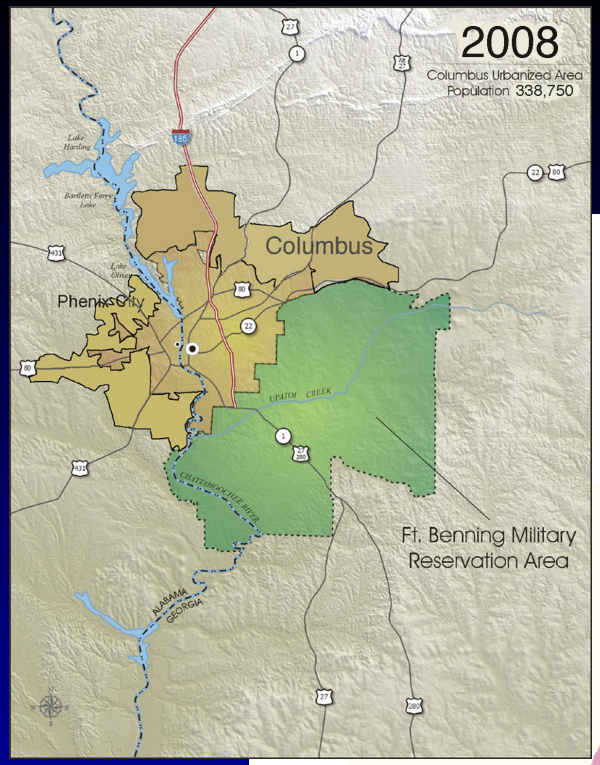
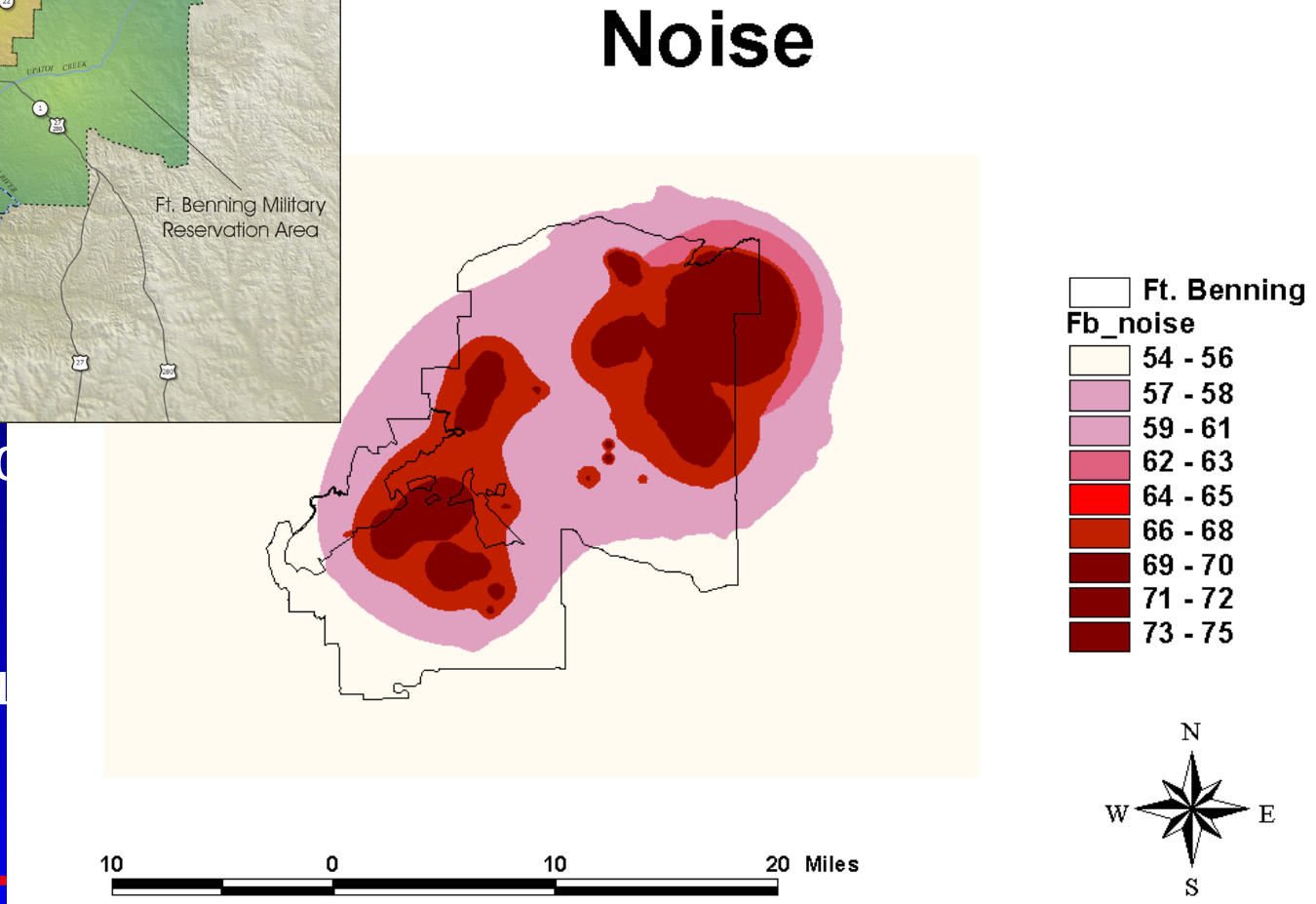
Noise Contours from Multi-Purpose Range Complex, Ft.



Projected Growth For Columbu



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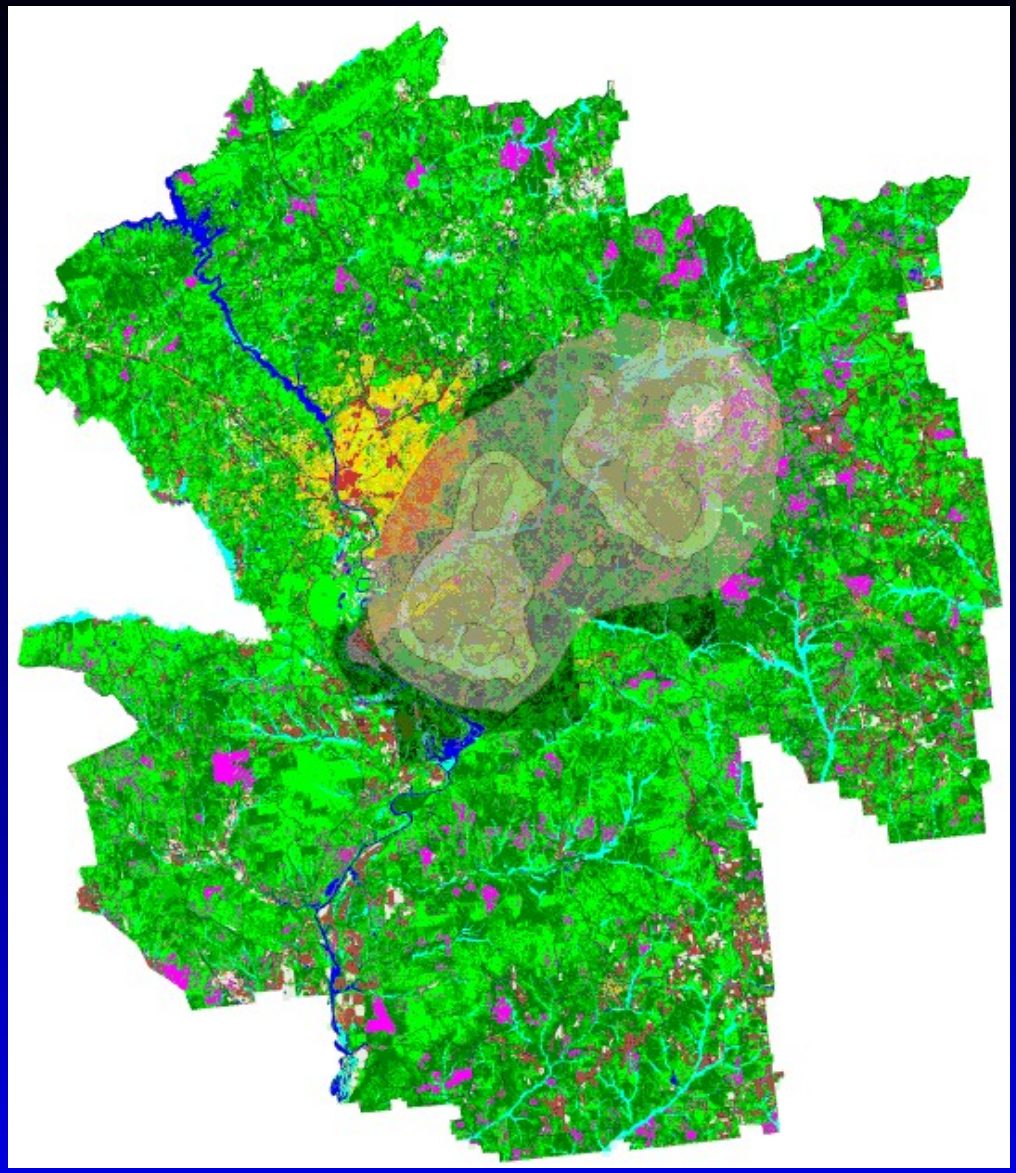
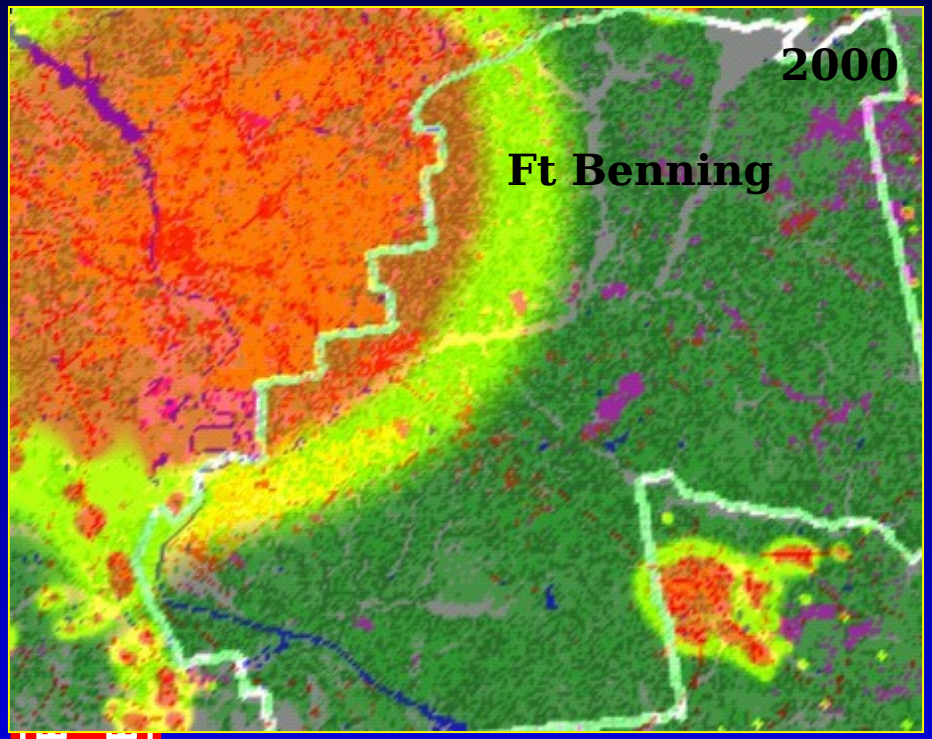
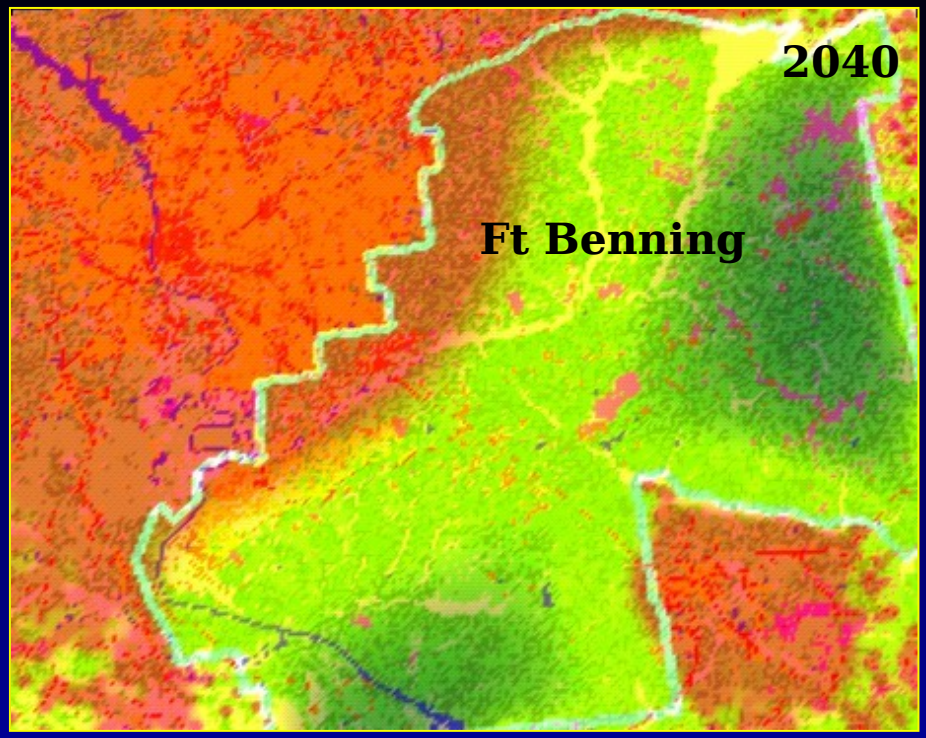
Identify Impacts on Training and Testing

- Impact on current/planned training
  - Noise vs Community Growth



Identify Impacts on Training and Testing





- Loss of future training opportunities due to possible noise related conflicts

Identify Impacts on Training &Testing

- Encroachment issues involve:
  - Habitat (TES)
  - Dust, smokes, and obscurants
  - Radio and television frequency
  - Air space for airfield operation
  - Blast and small arms noise
  - Community interaction
  - City and aircraft lights

Develop Mitigation Plans

- At the multiple-decade scale, long-term mitigation options can include a number of options including:
  - Changes or constraints of property right ownership
  - Expansion of installation lands (to increase buffer areas and ensure sustained use)
  - Collaborative development of parks, wildlife areas, forests
  - Altered location of highways and utilities

PONDS

Proactive Options with Neighbors for Defense installation Sustainability

- Legislative actions
- Relevant national, regional and local data sources
- Case studies
- Lessons learned from partnering actions
- Mitigation guidance

PONDS

Proactive Options with Neighbors for Defense installation Sustainability

Approach:

- Coordinate an Expert Review Team
- Collect, analyze and synthesize case studies
- Develop data base and build web page
- Maintain and update web page and database

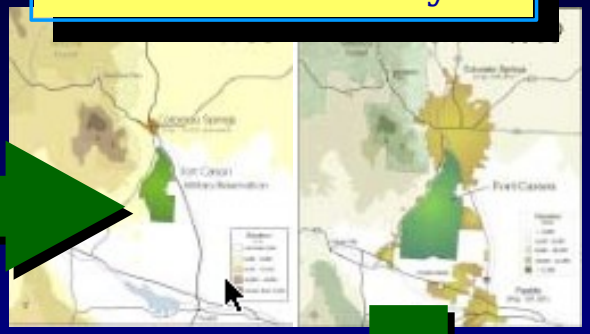
Schedule:

- Web Page and data base: Summer 2003
- Mitigation Guidelines: Spring 2004

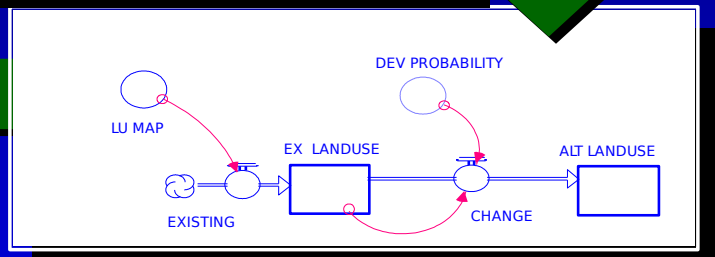
SERM Solutions

Assess and compare risks

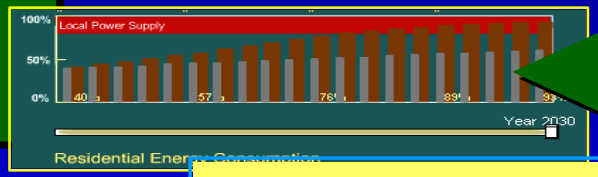
Conduct Trend Analyses



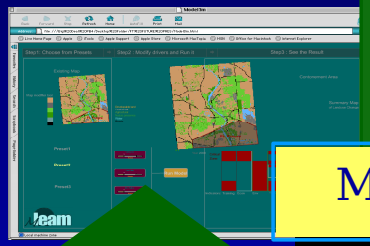
Project Future Changes



Identify Mission Impacts



Mitigate Problems



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Performing Partnerships

- **University of Illinois** – LEAM Development, Risk Analysis, Land Evolution Analysis, Regional Economics
- **USGS** – Land Use Land Cover Data, Urban Dynamic Analysis
- **ERDC :EL, CHL** – Linkages between land changes, watershed dynamics and receiving water conditions.
- **ERDC ITL**: High performance computing, technical architecture.
- **AEPI** – Land Availability Analysis & Strategies, Risk Analysis, Mitigation Policies.
- **Desert Research Institute** – Community/Installation Futures Analysis, Community Information Delivery
- **Oak Ridge National Lab** - regional habitat and air quality, Benning Analysis
- **Savannah River Ecology Lab** – fall line regional analysis
- **TRIES, Sam Houston State University** – Urban impacts on stream ecology

Points of Contact

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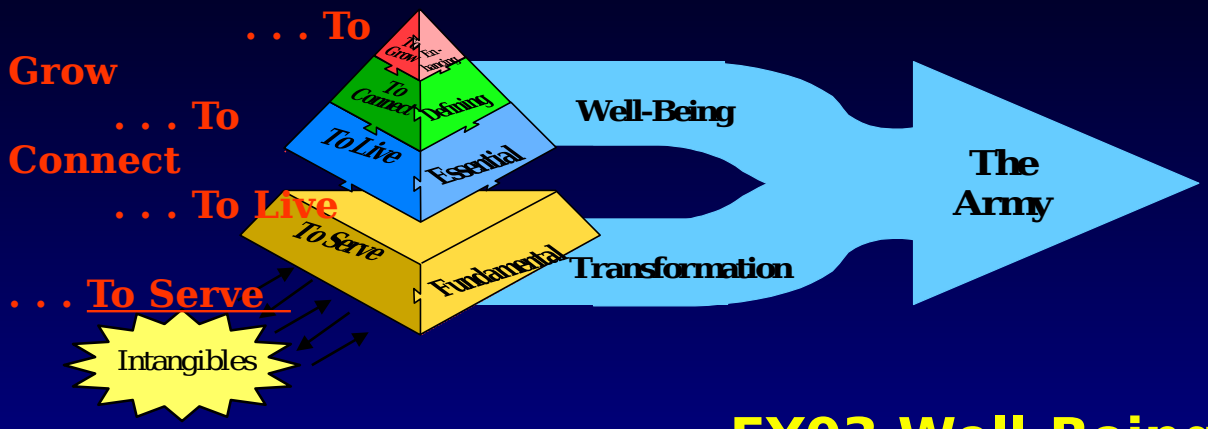
Army Well-Being



FY03 Well-Being Architecture

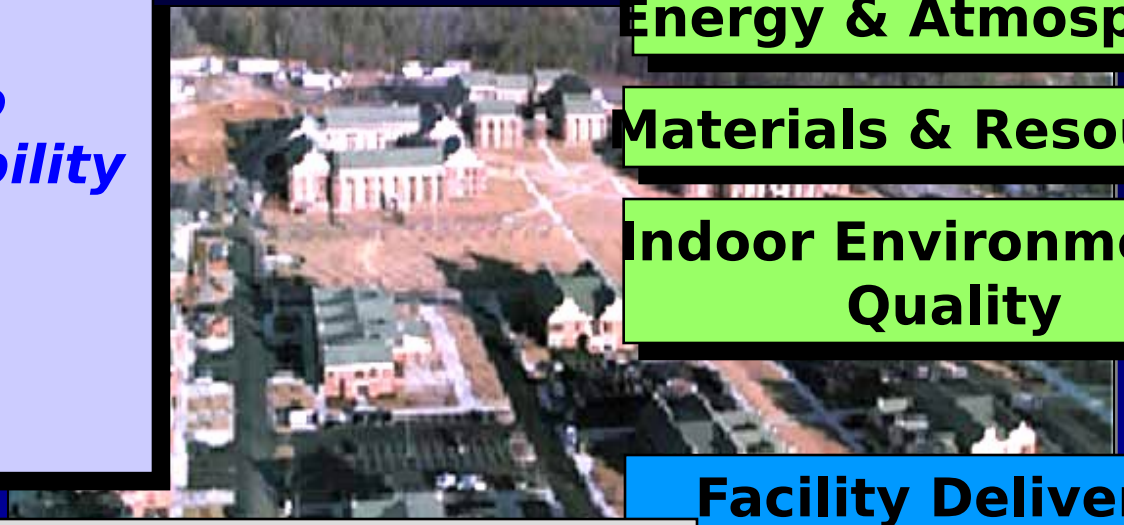
To Live
- Pay & Compensation
- Health Care
- Housing
- Continuous Learning

TO GROW
- Religious Programs
- Financial Readiness
- Educational Assistance
- Family Member Employment
- MWR

TO CONNECT
- Command Programs
- Workplace Environment
- Family Member Education
- Family Programs

Sustainable Project Rating Tool *(SPiRiT)*

SPiRiT- A self-assessment tool to evaluate sustainability of all facility construction and repair projects



- **Sustainable Sites**
- **Water Efficiency**
- **Energy & Atmosphere**
- **Materials & Resources**
- **Indoor Environmental Quality**
- **Facility Delivery Process**
- **Current Mission**
- **Future Mission**

ETL 1110-3-491 defines <u>sustainability</u> as ". . . the design, construction, operation and reuse/removal of the built environment (infrastructure as well as buildings) in an environmentally and energy efficient manner. . . meeting the needs of today without compromising the ability of future generations to meet their needs."

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